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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/577,457	05/24/2000	Mark Vincent Pierson	EN9-99-102	5505

7590 03/25/2003
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EXAMINER

MITCHELL, JAMES M

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 03/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/577,457

Applicant(s)

PIERSON ET AL.

Examiner

James Mitchell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 9-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6, 10, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fox et al. (U.S. 4,954,878) and Alcoe (U.S. 2002/0046856) in combination with Okinaga (JP 63-52432).

Fox (Fig. 3, 4) discloses an electronic package comprising a semiconductor chip or die (16) inherently having an array of conductive pads on one surface thereof (via contact with solder balls, 63), a low modulus (Column 3, Line 64) flexible layer of dielectric material (52) serving as an interposer having an array of copper metal plated vias (58; Column 4, Line 13) extending therethrough (from one surface of said dielectric)

to opposing surfaces thereof with said array corresponding to an array of said conductive pads (shown as 86 in Fig.6) on said chip and with each said metal plated via terminating in a metal pad (54,56) on each of said opposing surfaces with each said metal pad on one of said surfaces connected by solder (inherent in solder joint, 63) to respective ones of said array of conductive pads on said chip, a substrate (30) having an array of conductive pad (62) corresponding to said array of metal pads on the other side of said surfaces of said flexible layer and connected by solder (63).

Fox doesn't appear to explicitly disclose that the substrate is a circuit card or that said vias are sloped with respect to said surfaces.

However Alcoe teaches that a circuit card is a substrate (Claim 6)

It would have been obvious to one of ordinary skill in the art to form the substrate of Fox as a circuit card in order to provide a substrate as taught by Aloe.

Okinaga (Fig 3) utilizes slanted plated through holes or vias sloped with surfaces.

It would have been obvious to one of ordinary skill in the art form sloped vias in the insulating material of Fox in order to reduce capacity and inductance as taught by Okinaga (English Abstract).

With respect to claims 4 and 12 the prior art discloses the claimed invention except that it does not appear to explicitly disclose that the thickness of the dielectric is 10 to 15 mils or that its elastic modulus is in the range of 50,000 to 400,000 psi. However, absent evidence of criticality, it would have been an obvious matter of design choice to form the thickness of the dielectric to be 10 to 15 mils, since such a modification would have involved a mere change in size of a component. A change in

size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955); Gardner v Tac, 220 USPQ 777 (Fed Cir. 1984).

Further, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the range of elastic modulus between 50,000 and 400,000 psi in order to enhance compliant, since it has been held that where the general conditions of a claim disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (CCPA 1955).

With respect to the plated vias being copper, examiner takes official notice that it would have been obvious to one of ordinary skill in the art to plate the through hole with copper, because the metal is well known in the art in order to provide electrical contact between an interposer.

Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Fox and Alcoe as applied to claim 5, and further in combination with Sado (U.S 4,330,165).

Neither Fox nor Alcoe appear to disclose that the through hole forms a V shaped metal plated via, however Sao utilizes a V shaped metal plated via.

It would have been obvious to one of ordinary skill in the art to form the through hole of Fox V shaped in order to facilitate absorption of local stress as taught by Sao (Abstract).

Furthermore, absent evidence of criticality, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular dimensions of a

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sloped via or "V" shaped via because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Claims 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Fox and Alcoe as applied to claim 6, and further in combination with Brodsky (U.S. 5,984,691).

Neither Fox nor Alcoe appear to explicitly disclose an array of holes therethrough positioned between an array of copper plated vias, however Brodsky (Fig. 1, 4) utilizes an array of holes (64) positioned between an array of vias.

It would have been obvious to one of ordinary skill in the art to incorporate an array of holes in the interposer of Fox and Aloe in order to reduce stress as taught by Brodsky (Column 7, Lines 8-9).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fox and Alcoe as applied to claim 6, and further in combination with Isaacs et al. (U.S. 5,275,330).

Neither Fox or Alcoe appear to explicitly disclose that plated through holes (PTH) or vias are filled with solder, however Isaacs (Fig 9) utilizes a PTH filled with solder.

It would have been obvious to one of ordinary skill in the art to fill the PTH or via of the prior art with solder in order to prevent unreliable electrical connections as taught by Isaacs (Abstract).

Response to Arguments

Applicant's arguments filed January 23, 2003 have been fully considered but they are not persuasive. Applicant contends that sloped vias are not taught by Fox et al. and further bases a lot of its argument on this premise, which examiner respectfully finds irrelevant. Examiner agrees with applicant that fox does not show sloped vias and that is why the rejection is not one of **anticipation**, but obviousness. A prima facie case for obviousness is established by a showing of a reference that predates applicant's invention and a motivation for the combination, which is established in the record. Applicant's mere assertion without any proof that a combination is not obvious is not enough to overcome the rejection and thereby shift the burden of proof. As for applicant's contention that structural and functional differences between the prior art and applicant's invention would not flow from the prior art and that applicant's invention is in a different environment is unpersuasive, since the structural limitations as claimed have been met. As for applicant's contention that Fox et al. does suggest sloped vias to facilitate freedom to flex both horizontally and vertically is moot, since those limitations are not claimed.

As stated in the last office action, applicant reasons for employing sloped vias are not material, since the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art (obviousness type rejection) cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

In response to applicant's argument that it is "not clear how the vias of Fox et al [and Sado] would be sloped...[incorporated]," the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

As to applicant's statement that of the size of the dielectric and vias is not "a simple component of some larger combination, but...is a central feature of the invention," examiner's prior art discloses the structural limitation of applicant's central feature, except for its the size. Applicant has not established that size is critical. A mere statement that a structure is a central feature, does not establish criticality. Furthermore, applicant failed to fully disclose how the alleged case lay cited in the office action is of "different facts" than are presented here.

As for applicant's contention that it is not claiming any dimension of a sloped via is moot, since claim 7 explicitly calls for a "V" shaped metal plated via.

As for applicants contention that the Brodsky reference teaches an elongated and curved apertures and therefore not an array of holes is unpersuasive. The elongated and curved apertures are a grouping of holes as defined as an opening through something and therefore are literally an array of holes.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Mitchell whose telephone number is (703) 305-0244. The examiner can normally be reached on M-F 10:30-8:00.

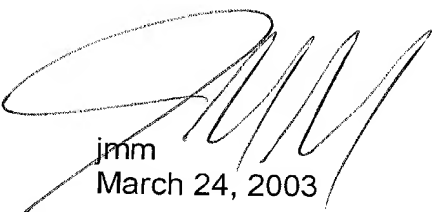
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone

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numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3230 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



jmm
March 24, 2003



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SUPERVISORY PATENT EXAMINER
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